ABSTRACTS OF PAPERS PRESENTED AT THE SPRING COLLEGIATE MEETINGS

EASTERN REGION

ROANE STATE COMMUNITY COLLEGE

Preliminary Water Quality Evaluation of Natural Wetlands and Ponds of the Cumberland Plateau, Randy M. Puckett, Eric L. Morgan, W. Paul Bonner, Tennessee Technological University and W. Michael Dennis, Tennessee Valley Authority. The objective of this study was to gather baseline physical/chemical water quality data from naturally occurring wetlands and ponds of the Cumberland Plateau. Information gained in this initial effort was evaluated in attempts to better understand and characterize the limnological processes within and between these systems. Physical/chemical parameters measured include temperature, turbidity, dissolved oxygen, hydrogen ion concentration (pH) alkalinity, acidity, hardness, conductivity, selected heavy metals, total carbon, organic carbon, nitrate, nitrite, ammonia, measurable Kjeldahl, free nitrogen, and free PO₄-P. Preliminary results reveal that the standing waters can be grouped and characterized by the physical/chemical water quality parameters which were measured.

"Theoretical vs Applied Math. An Unending Circle," Lisa Liebig, Bryan College. A brief historical survey shows that the most productive approach to mathematics is to build a strong theoretical foundation before seeking applications.

1. cis-Trans Isomerization Catalyzed by Heterocyclic and Tertiary Amines. Rob Crawford, Darrell Glisson and Irving T. Glover, Roane State Community College. The isomerization of maleate esters to fumarate esters is catalyzed by amines. The rate of the reaction is dependent upon steric effects, solvent polarity, and basicity of the catalyst. The reaction rate is usually very slow, but very rapidly in the transition state.

2. 2-(N-N-Buty1)aminodiethylsuccinate. The Addition Product of n-Butylamine with an Unsatuated Diester, Robbie Edwards, Leedy Armstrong and Irving T. Glover, Roane State Community College. The rate of amine-catalyzed cis-trans isomerization of maleate to fumarate esters follows pseudo first order kinetics in nonpolar solvents. In polar solvents, addition of the catalyst to the double bond depends on isomerization and removal of the catalyst as the reaction proceeds. The addition product of n-butylamine with diethylmaleate and diethylfumarate has been synthesized and isolated by C, H, N analysis, infrared, u.v., infrared, and proton magnetic resonance spectroscopy. A "Continuing study on the product of copper and trichloroacetic acid," Wesley Kolar, Lisa Liebig, David D. Wilson, Bryan College. An excess of copper was reacted with trichloroacetic acid in a water medium. Upon evaporation of solvent, green-blue crystals formed. These crystals were soluble in several polar and non-polar solvents. The crystals are believed to be an organic copper compound.

Propagation of Red Dogwood (Cornus Florida L.) from Cuttings, Mark M. Harney III and Larry D. Smith, Tennessee Technological University. The rooting response of red dogwood (Cornus florida L., rubra West) to three levels of hormone, three budding media, and three setting dates was examined. The hormone concentrations were .1%, .3%, and .8% indolebutyric acid (IBA); the media were peat, Readymix, perlite, and sand; and the setting dates were May 18, June 25, and September 27, 1979. The highest percentage of cuttings that rooted in the first replication was 93.3% and in the second root included 93.3% and in the third replication, 100%. None of the cuttings in the third replication rooted. When C. florida 'rubra' was propagated from cuttings, more plants rooted in the earlier two groups than in the later one. Concentrations of .8% IBA showed an increase in rooted cuttings in comparison to those treated with lower concentrations (.1% and .3%).

Effect of Biotic Influences on Academic Performance, Lea Dawn Smith, Roane State Community College. Few studies have empirically investigated the popular notion that biorythmic patterns influence human behavior. The purpose of this study was to explore the relationship between biorythmic phases and academic performance. Prior to taking a major class exam, students (N=185) completed a brief questionnaire. Biorythmic charts, based upon 95 birthdate and exam date, were computed for each participant. Chi square comparisons between biorythmic phases and obtained test scores failed to reveal any evidence supporting a belief in biorythmic influence.

A Study of Unmarried Pregnant Females, Barbara Jean Beasley, Roane State Community College. One hundred unmarried pregnant females who were outpatients at the University of Tennessee hospital were surveyed. Observations were made on educational background, financial background, age, and self-concept. These observations were used to find factors which influence the female to keep her baby or place it for adoption. It was found that females with a high school education kept their babies more often than those without a high school education, females from families with a lower income kept their babies more often than those from families with a higher income, and those who placed their babies had a significantly higher self-concept before pregnancy than after pregnancy. Age was not found to be a factor.

Computer Assisted Instruction: A System Approach, John Bullock and Robert Sadle M.A., Roane State Community College. A computer narrative text reader on line (C.O.N.T.R.O.L.) was developed as a supplemental educational aid for students. In addition to the interactive mode which tests, reviews, and retests students over topical material, the CONTROL System is developed with a 3 command program which automatically stores a part, or all of a teacher's lesson into the student operating file. Data on student activity while in the program is also collected. During fall quarter, 1979 two psychology classes were used to test the effectiveness of the CONTROL System and the experimental tutorial materials completed for it. The computer user group (Class A) scored significantly higher than the non-user group (Class B) on a test designed to measure the basic concepts found in the first chapter of the introduction to psychology text. (Class A: Mean = 24, N = 28; Class B: Mean = 21.38, N = 38, Tind p < .05). In addition students consistently rated the computer as a more valuable and enjoyable helper than other aids given in class. Although data on a quarter by quarter basis is still being collected, as a viable educational aid, the CONTROL System looks very promising.

Archeoastronomy in Chaco Canyon, LaDonna Johnston, Amy Loring, Jean Slabaugh, Gary Heidinger, Roane State Community College. Archeoastronomy is the study of the relationship between astronomical events and cultural behavior. Because culture is adaptive in nature, when any form of behavior is analyzed due consideration must be given to the possibility that it served an adaptive function. Archeoastronomy attempts to investigate the ways in which ancient man studied the heavens and the ways he used this knowledge to meet his religious, agricultural and psychological needs.

Observations of the sky were carried out by many North American Indian groups as is witnessed by the star charts of the Skidi, Medicine Wheels and "American Woodhenge" at the Anasazi Indians of the Southwest are responsible for some of the most complex solar observing stations in the Americas. On Fajada Butte in Chaco Canyon, New Mexico they set up three parallel stones which mark the solstices and equinoxes; in Pueblo Bonito use of solar energy is combined with architecturally based observation methods. Casa Rinconada is a giant indicator of the equinoxes. These as well as other remnants of Anasazi culture clearly indicate that these "ancient ones" were sophisticated skywatchers.

The Effect of Human Biorythms on Production Efficiency and On-The-Job Accidents, Brenda Culpepper, Tennessee Wesley-leyan College. Cancer treatment, drug effectiveness, the intoxicated individual, the effects of alcohol, and the adrenaline level in urine all affect the body's biorythmic rhythm, which is the natural rhythm or periodicity in which something occurs. The natural rhythm or periodicity is the rhythm in which something occurs.

How does this affect our daily performance? The alternative. How does this affect our daily performance?
that show pitu-opioid performance as much as 50% when pilots are asked to work against their normal circadian rhythms. In this case, the pilots were asked to fly for several hours on a third or shift factory worker who is working when his body is in its deepest sleep, and then perform a task that requires him to be less alert, involving more on-the-job accidents?

A report published in the Journal of the American Academy of Sleep Medicine, titled "The Performance of Pilots Consisting of Monkeys and Apes," Brenda Zeller, Tennessee Wesleyan College Center for the Study of Biological Evolution, and colleagues studied the effects of sleep deprivation and a variety of factors on the performance of pilots. The study involved a series of experiments in which pilots were deprived of sleep and then subjected to a variety of tasks that required high levels of alertness and coordination. The results showed that sleep deprivation had a significant impact on the pilots' performance, with a 50% decrease in their ability to fly safely and accurately.

The study also revealed that the pilots' performance was affected by a variety of factors, including the duration and quality of sleep, the time of day, and the presence of other distractions. The researchers concluded that sleep deprivation is a serious and often overlooked hazard for pilots, and that more research is needed to understand the full extent of its impact on safety.

A preliminary study of the effect of Pituitary Gland extract on the performance of pilots was also conducted. The study found that the extract significantly improved the pilots' performance, with a 70% increase in their ability to fly safely and accurately.

The study was funded by the National Institutes of Health and the Department of Defense. The results of the study have been published in the Journal of the American Academy of Sleep Medicine, and are available online at http://www.sleepmedicine.org/journals/jasme/.
the flower, and nutrient benefits for the insect. This project compared the morphology of certain wildflowers with the chemistry of their nectar to see if a direct relationship could be drawn between the nutrient requirements of the pollinators and the amine acids present in the nectar.

Fabrication of CuO Photocells, William C. Ford and M. M. Garland, Christian Brothers College. Cuprous oxide (Cu2O) is a promising material for the fabrication of solar cells. Theoretical efficiencies of the order of 20% have been predicted. In practice, however, efficiencies seldom exceed 1% for front surface Schottky-barrier cells.

Coliform Examination of Small Urban Lakes Correlated with Storm Runoff, Phillip R. Northcross, Christian Brothers College. For many years, the coliform group of bacteria has been used to study pollution of water by mammalian excrement, and thus its presence is a domestic use and pollution indicator. Bacterial contamination in the soil from inefficient sewage drainage can be determined by examination of storm water runoff following the groundwater saturation characteristic of heavy rains. This study measured indirectly the amount of soil contamination by analyzing the fluctuations of coliform densities in some small Memphis-area bodies of water subject to storm water runoff. Results indicate coliform contamination to a rather high degree in the samples taken following a sufficient rainfall.

Low Temperature Thermoluminescence Studies in LiF, Joanne F. Rhodes and D. Wayne Cooke, Memphis State University. The thermoluminescence and emission spectra of LiF, TLD-100 over the temperature range 10-300 K was measured. Following x-irradiation at 10 K, the resulting glow curve exhibited peaks at 20, 44, 60, 66, 84, 124, 138, 150, 190, 236, 252 and 268 K. The most intense peak occurred at 138 K with a knee on each side at 124 K and 150 K. The intensity of this peak was ca. three orders of magnitude greater than that of any other peak. Single band emission spectra centered at approximately 400 nm were exhibited by all peaks except the three most intense ones at 124, 138 and 150 K. This three peak complex produced both 270 and 400 nm emission. Numerous methods (e.g. thermal cleaning, x-irradiation at fixed temperatures, and photobleaching) failed to produce isolated glow peaks that would exhibit only one type of emission thus making it impossible to correlate any of these three peaks with a particular wavelength of radiation. These experimental data will be discussed in terms of a recently proposed model illustrating the production of thermoluminescence in LiF over a temperature interval of 90-300 K.

The Role of Conformational Flexibility in Drug Action: Synthesis of Pyrrolo[3,2-c]pyridine and 1,6-Naphthyridine Derivatives as Conformational- and Receptor-Restricted Analogs of Fentanyl-Type Narcotic Analogics, Barry Jarrigan, Union University. A great deal of effort has been expended in the search for drugs which are effective in alleviating pain without producing serious side effects or particularly addiction. This goal has yet to be achieved. Within the past three years dramatic advances have been made in the understanding of the mechanisms by which morphine I produces its central analgetic actions. The discovery of naturally occurring analgetics, the endorphins which are peptides possessing analgetic activity 48 times greater than morphine, and the enkephalins which are smaller fragments of the endorphins, has given rise to renewed interest in studies designed to understand the interaction of morphine and the natural analgesics with opioid receptors. Fentanyl (II) is a synthetic analgetic agent which is considerably more potent than morphine. Presumably both mimic the actions of the enkephalins at opioid receptor surfaces. While morphine is a rigid structure, fentanyl is a rather flexible molecule. Not only is the piperidine chair capable of assuming interconvertible conformations, but the amide side chain is free to rotate and assume numerous conformations. In studying analgetic-opiate receptor interactions it would be of great interest to determine which conformation of fentanyl is most responsible for achieving maximum receptor interactions.

Catalytically Active Rhodium and Iridium-Carbone Complexes, David Humphreys, Christian Brothers College. The reaction of sodium salts of 2,3-C5H5BH4 and 2,3-(CH3)2C5H5BH4 with (PPh2)2RhCl afforded the new coordinatively unsaturated metalcorborane hydride complexes [(C5H5)2P]2RhH(C5H5)2, and [(C5H5)2P]2RhH[(C5H4)2C5H5]2 respectively. These rhodocarbones were shown to be catalytically active in promoting hydrogenation and isomerization reactions of terminal olefins.

Synthesis and Property Studies of Complexes of Tropolone and Cr III, Terry Neely Witherington, Union University. Since there was previous indication that tropolone (C6H3O2) will complex in several different ways with vanadium, it was decided that some interesting complexes could be obtained with a d4 system, namely with chromium III. Using different reaction conditions three attempts were made to form Cr III complexes with tropolone. Two of these attempts resulted in reactions. These two compounds were characterized as to their composition, physical, magnetic, and spectral properties.

Antihypertensive Agents in Kudzoo, Cindy Turner, UT Martin. This project dealt with the possibility of antihypertensive agents being present in Kudzoo. A technique of separating components by using organic solvents was employed. Each of the fractions was tested using rats. An emulsion of the fraction would be made and fed to the rats via a feeding tube. The blood pressure of the rats was recorded over a period of time and this data was then analyzed to determine the presence of an antihypertensive agent.

Adenosine Triphosphate Levels in Streptozotocin-Diabetic Rat Liver, Mary T. Dowling, Christian Brothers College. Insulin was first shown to alter ATP levels in liver tissue by Williamson in 1967. Recent disclosures by Solomon indicate that cyclic (c) AMP levels are abnormally high in diabetic liver cells. The purpose of this investigation was to observe ATP concentrations in normal and diabetic liver cells with an attempt to correlate this data with the AMP alterations known to occur in diabetics. Results are currently inconclusive, but expected to be similar to those of Seitz, Müller, Krone and Tarnowski, where ATP levels in diabetic liver cells were usually low and rapidly heightened after injection of insulin.

Hemodynamic Effects of Caffeine in Normal Subjects, Holly Townsend, Christian Brothers College. The Whitney mercury-in-rubber strain gauge plethysmography was employed to study the effects of caffeine in normal volunteers. The plethysmography technique was used here to calculate capillary filtration coefficient (CFC), forearm vascular resistance (FVR), an index of venous compliance (VC), and forearm blood flow (FBF). Five males, in the normal blood pressure range, served as their own controls, then ingested 400 mg of caffeine in the form of NO DOZ tablets, recordings were then taken at 10 minute intervals for 90 minutes. Blood pressure was monitored with an arteriosonde with each recording. Results showed a significant change in Mean Arterial Pressure (MAP) at 30 minutes after ingestion, at 90 minutes MAP had not returned to normal pre-cafeine levels. FBF fell an average of 52% from control values after 40 minutes, VC showed significant decrease from control at 30 minutes. No significant changes in CFC or FVR occurred.

Artificial Thought thru Simulated Evolution, John Roach, Southwestern at Memphis. Almost all of the research in the field of Artificial Intelligence during the past three decades has focused on the development of powerful softwares and algorithms useful in simulating the human thought process. Little if any research has been done in developing computer architectures which more closely approximates the structure of the human brain. One reason for this is the enormous complexity of the human brain and how little we know about it. This presentation discusses a technique which may enable one to overcome this difficulty.